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Chemistry, C. D. Woods, of the University of Maine, chairman; College Work, J. H. Raymond, of the University of West Virginia, chairman; B. O. Aylesworth, of Colorado Agricultural College, secretary; Entomology, M. V. Slingerland, of Cornell University, chairman; H. A. Morgan, of Louisiana University, secretary; Mechanic Arts, H. W. Tyler, Massachusetts Institute of Technology, chairman; F. P. Anderson, of Kentucky Agricultural and Mechanical College, secretary; Horticulture and Botany, L. R. Jones, of the University of Vermont, chairman; W. J. Green, of Ohio Experiment Station, secretary.

A. C. TRUE.

RECENT WORK ON MOLLUSKS.

THE land shell fauna of the Hawaiian Islands has been discussed by E. R. Sykes, with intercalations on anatomy by Lieutenant-Colonel Godwin-Austen.* Mr. Sykes has worked upon museum material, especially that collected by Perkins and the rich stores of the British Museum and the Boston Society of Natural History. He finds the number of species much exaggerated, as every one familiar with the group was well aware. The fauna is considered to be Polynesian and to show hardly any trace of Asiatic or American influence. Oahu is the center of distribution and the most populous in Achatinellidæ. The list given is a useful one, but the monographic study of the Achatinellas from an evolutionary standpoint remains to be written.

A. S. Jensen, of Copenhagen, initiates what promises to be a series of 'Studier over Nordiske Mollusker,' by an investigation of the forms and distribution of the boreal Myas.† The paper is illustrated by some excellent figures.

* *Fauna Hawaiensis*, II., pp. 271-412, pl. 11, 12. 1900. 4to.

† *Vidensk. Meddel. nat. Foren i Kjobenhavn*, pp. 133-158. 1900.

F. C. Baker* discusses the gross anatomy of *Limnæa emarginata* Say, var. *Mighelsi*. There are six plates, two illustrating what the author believes to be the range of variation in the form of the shell, the others, which are rather diagrammatic, illustrating the anatomy. If carefully done, papers of this kind will have a permanent value.

M. Maurice Cossmann continues his phenomenal activity in the field of Tertiary mollusks, by a paper which is to be followed by others on the 'Mollusques Éocéniques de la Loire Inférieure.'† An interesting series of forms is figured, and it is curious to see how many of them recall parallel species from our own Claibornian horizon.

Mr. W. J. Fox in a recent number (306 p. 718) of this Journal refers to a shell named by Osbeck in his 'Reise nach ost Indien und China,' 1765, *Cunus chinensis*. The objectionable generic name was doubtless derived from Linnæus, who used it in the manuscript of the Museum Ludovicæ Ulricæ for the shell now known as *Venus dione*. It was not published by Linnæus, who substituted *Venus* in the tenth edition of the *Systema Naturæ* and afterward in the *Museum Catalogue* referred to. A very interesting account of the gradual evolution of the early Linnæan generic names, and of the binomial system itself, will be found in a paper by the late Professor Sven Lovén 'On the species of Echinoidea described by Linnæus,' in the *K. Svensk. vet. Akad. Handl.*, Bd. 13, IV., No. 5, 1887, pp. 3-60. Luckily Osbeck's application of the name referred to seems unidentifiable.

The great Baikal Lake of Eastern Siberia has long been regarded as having had connection with the sea at some previous epoch, and various opinions have been held

* *Bulletin Chicago Acad. Sci.*, II., No. 3, pp. 191-212. June, 1900.

† *Bull. Soc. Sci. Nat. Nantes*, I., pp. 307-336, pl. XXII.-XXVI. 1900.

as to which body of sea water it was originally connected with. Dr. W. Dybowski contends that the 'stammform' of one of the Baikal sponges (*Lubomirskia baicalensis*) is an inhabitant of Bering Sea. Hoernes has regarded the fauna of the lake as analogous to that of the Sarmatic beds of Southern Europe, but this analogy is hardly greater than it bears to various other late Tertiary lake-beds, including those of our Great Basin. In the September number of the *Nachrichtsblatt der deutschen Malakozoologischen Gesellschaft*, Dybowski announces the discovery of a Nudibranch (*Ancylodoris baicalensis*, Dyb.) and the presence of numerous Trochophora larvæ in April, in the lake. These being strictly marine animals, never before reported from fresh water, the evidence as to the lake's origin seems conclusive, and its character as a 'relict-en-see' positively established.

Mr. Henry Hemphill has recently forwarded to the National Museum a photograph of a six-valved specimen of *Ischnochiton* obtained by him at San Diego, California. Seven-valved specimens (the normal number being eight) are known to be preserved in the British Museum and the Academy of Natural Sciences at Philadelphia; and now Mr. E. R. Sykes figures in the *Journal of Malacology* (VII., p. 164) a three-valved specimen of *Ischnochiton contractus* Reeve, from South Australia. The rarity of these abnormal individuals makes the discovery most interesting. In another note Mr. Sykes records the presence in the fauna of Natal of a species of the genus *Cryptoplax*, previously supposed to be confined to the Indo-Pacific and Australian provinces.

Dr. George W. Taylor, of Nanaimo, has added a new genus to the fauna of the Pacific coast in the shape of an undescribed species of *Phyllaplysia* (*P. Taylora*) which was found near Nanaimo on floating seaweed. The animal is of a clear lemon-yellow, about an inch in length and with a

nearly smooth surface. The genus has heretofore been known only from the coasts of France and the Adriatic.

Pelseneer has been pursuing researches on the various mollusks believed to exhibit archaic features.* He devotes attention chiefly to the Chitonacea, the Docoglossa, Rhipidoglossa and Solenoconcha. His conclusions do not include any remarkable novelties, but afford in many cases additional confirmation of opinions long held or occasionally expressed by malacologists. Thus he considers the metamerism of chitons to be a secondary, not primitive, condition; recognizes the features of the Docoglossa limpets which are analogous to those of the Amphineura, confirms the unlikeness of *Scissurella* to *Pleurotomaria* and the asymmetry of the epipodial processes in the Trochidæ. Some interesting new facts are recorded among the Pyramidellidæ; *Odostomia* was found to be hermaphrodite, but otherwise related to ordinary Pectinibranchs. The Scaphopods he considers to have distinct relations with the Rhipidoglossate gastropods, but one of the characters, the opening of the genital duct into the right nephridium, has already been shown to be fallacious by H. Fischer, the error being due to the torsion in the embryo. It is probable that this supposed relation will not be accepted by students of the group. In regard to the nephridia of both Docoglossate and Rhipidoglossate limpets, Professor Pelseneer is at variance with Erlander; but in another contested hypothesis, the relation of the Placophora and Aplacophora, in which he differs from Thiele by regarding the groups as related, we believe Pelseneer to be right. At any rate, whether all details be confirmed by future research or not, the present paper contains much which will prove welcome to students of the Mollusks.

* *Mém. Acad. Roy. des Sci. de Belgique*, LVII. 1899. Pp. 113.

Professor L. Cuenot (*Arch. de Biologie*, XVI., 1899) has published some interesting researches on the excretory organs and their functions in a variety of mollusks. In these he shows how different portions of the nephridia excrete different effete elements of the fluids of the body and how these functions are distributed. The memoir has been crowned by the Royal Belgian Academy.

An unusual condensation of embryonic stages has been observed in two nudibranchs, *Cenia cocksi* by Pelseneer, and in *Pelta coronata* by Vayssi re. These embryos do not exhibit the usual embryonic velum and shell of other Opisthobranchs, but the body at an early stage becomes covered with vibratile cilia and rotates in the fluids of the egg (*Zool. Anz.*, XXIII., 1900).

In the *Proceedings of the Malacological Society* (IV., No. 3, October, 1900), Mr. M. F. Woodward gives some important information in regard to the anatomy of three members of the Volutacea, the significance of which is, however, somewhat obscured by the author's want of knowledge of the present state of the nomenclature. The paper gives a general account of the macroscopic anatomy of *Neptuneopsis Gilehrisi* Sowerby, a newly described and peculiar form from South Africa, and of '*Voluta*' *ancilla* and '*Volutilithes*' *abyssicola*, Adams and Reeve. Of the anatomy of the latter nothing was known. The *Neptuneopsis* was described in a South African publication which has not reached this country, and is generally inaccessible, so it is to be regretted that Mr. Woodward did not recapitulate the shell characters for the benefit of students. The radula also had been abstracted from the specimen before it was received by him, so that the chief aids to systematic classification are wanting. However, it seems pretty certain, from the characters of the nervous system, that the animal is nearly related to the Volutid , and, since it has

an operculum, probably to the true volutes which Mr. Woodward calls *Volutolyria*, a name which is an absolute synonym of *Voluta* (L.) Lamarck. Until more information is received it would be rash to come to more precise conclusions as to its systematic place.

The only data in relation to the anatomy of *Volutilithes* properly speaking (as far as one can judge from the shell, the type being *Voluta spinosa* Lam., a fossil species) were given by me in the *Proc. U. S. Nat. Mus.* (XII., No. 773, p. 315, 1889) from an examination of *V. Philippiana* Dall., from the South American coast. To the data there supplied it may be added that the dentition consists of a single longitudinal row of 50 tricuspid teeth, the cusps being long, thornlike and somewhat decurved. It has no operculum and is blind. This radula is most like that of *Cymba olla* L. and *Volutilithes* doubtless belongs to the *Scaphelid * as does *Cymbiola* (or *Scaphella*) *ancilla*. In 1890 I separated the group to which '*Volutilithes*' *abyssicola* belongs, as a subgenus *Volutocorbis*, as it obviously could not be classed with the original *Volutilithes*. This course is now fully justified by the anatomical details supplied by Mr. Woodward, the most remarkable of which is the radula, which has two rows of unicuspid laterals, one on each side of the rhachidian tricuspid tooth. This radula is unlike any of the Volutacea yet known, as *Volutomitra*, which Woodward compares with it, has, like the others, only a single row and Troschel in his text explains how the deceptive appearance of laterals in one of his figures arises from the crushing of the base under a cover glass. The single rhachidian of *Volutomitra* is well figured by Stimpson (*Bull. U. S. Nat. Mus.*, No. 37, pl. xxxiv., Fig. 7). The radula of *Volutocorbis* is intermediate between that of *Vasum* and that of *Oliva*. The group will now take rank as a distinct genus. If it remains in the Volu-

tacea it must be placed in the Scaphellidæ. The chief distinctive characters of this family, beside the conditions of the larval shell and the absence of an operculum, appear, from Woodward's researches, to be the extreme condensation of the chief ganglia around the gullet, the development of a very large œsophageal cæcum (which led Poiret to suppose *Halia* had a double œsophagus), and two pairs of preneural salivary glands. If the family is divided into two subfamilies on the basis of the radula, Volutomitrinæ with a unicuspid median tooth, will include *Amoria*, *Volutomitra* and *Halia*; while Scaphellinæ with a tricuspid tooth will include the others. The typical *Voluta* and *Lyria* have wide rhachidian teeth with many cusps, an operculum, shelly protoconch, and other characters which separate them entirely from the Scaphellidæ. According to our present knowledge one of the most important results of Mr. Woodward's labors is to show that the old family of Volutidæ included many diverse types, and that a great deal remains to be done before we can proceed to generalize with safety on those of which the neopionic stages and anatomy are unknown.

WM. H. DALL.

RICHTER AND THE PERIODIC SYSTEM.*

A VERY remarkable work appeared at the close of the last century. This was 'Die Anfangs-gründe der Stöchiometrie,' by J. B. Richter, the first volume of which appeared in 1792, and the third and last volume in 1794. In this book we have the first definite statement of the law of proportionality, and some have thought that they have found in it also the Atomic Theory, though it was not claimed that this theory was definitely stated.

Richter's work attracted attention at the time because of his defense in it of the

phlogistic theory and it was vigorously attacked by the supporters of the New Chemistry, who followed Lavoisier and the French chemists. The deeper purport of the book and the new ideas advanced do not seem to have been well understood or to have been largely commented upon. Fischer, who in 1802 translated into German Berthollet's 'Statique Chimique,' was apparently the first to draw general attention to the work of Richter and to its bearing upon the conclusions drawn by Berthollet. This latter chemist and Guyton de Morveau acknowledged that Richter had anticipated them in the inference to be drawn from the permanence of neutrality after the decomposition of certain neutral salts and the possibility of calculating beforehand the composition of the salts produced. The discovery of the law of proportionality was a most important one and Richter must, therefore, be regarded as a very remarkable man. In his discovery that the amounts of different metals combining with a given weight of acid combine with a fixed amount of oxygen, he went a step further, anticipating the work of Gay Lussac, and when he established the fact that such metals as iron and mercury have the power of combining with oxygen in several proportions, showing different degrees of oxidation, he was several years ahead of Proust and verged upon the discovery of the law of multiple proportions.

With all his ability to see deeply into the workings of natural phenomena, Richter was not a clear and logical thinker. Wurtz rightly speaks of him as 'the profound but perplexed author of the great discovery of proportionality.' He was confused by his adherence to the illogical phlogistic theories which were becoming each year more untenable. He was further hampered by his determination to give a mathematical foundation to the science of chemistry and to express all chemical changes by formulæ

* Read before N. C. Section, Amer. Chem. Soc., Nov. 9, 1900.